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Home-making

- architects, users and the 'prefab' -

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Home-making



Gottfried Müller, *12 Bauwerke* – from & for Matthias!
(www.digitab.de/mueller/index.htm)

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London, Summer 2006

Home-making – architects, users and the ‘prefab’ –

Abstract

It seems a fact that modern architecture still has not reached people at home, within their own four walls. I was therefore seeking for an instrument which bears the potential of bringing architects and users into closer contact, and found it with the prefabricated house. Making use of prefabrication for domestic architecture involves a third partner, the building industry. Consequentially, I have explored ways of forming fruitful collaborations between architects, users and the building industry, for a “trialectic”¹ design of a home.

My report is structured into two parts: in PART I, I investigate the peculiar reputation of the prefabricated house, being historically split into a modernist, “architectural” and a commercial, “non-architectural” development. The first represents the architectural profession, the latter the building industry, which succeeded where modernism failed – in reaching the wider public. This leads to two different points of view looking at the ‘prefab’: the architect’s and the housing industry’s view, representing the mass of homebuilders. For understanding these, I shed light onto the characteristics of architectural practice, the particular meaning of ‘home’ and the demands and needs of the user, resulting in contrary understandings of the ‘design’ of a home. Concerning the last point, the field of participation in architecture demonstrates how architect and user can be united into a – very particular – building project.

Complementing the first part – the theory, PART II illustrates the thoughts and ideas with the help of built examples – the practice. I therefore present a collection of recent projects in prefabricated housing, as a ‘catalogue’ of the recent state of affairs. The precondition for selecting a model was that each had to include elements of modern architecture, participation and prefabrication – enabling a trialectic design. Since there are very different attempts to use prefabrication, I divided the case studies into five categories and set up an overall tabular list for evaluation. This enables the reader a quick overview and an easy comparison of all models and evokes questions regarding social, political, economical, architectural and urban issues.

Form and contents of my report express that there are various elements with potential for an application for a contemporary home. If I regarded the built environment as a ‘catalogue’, it would be possible to extract valuable elements for a particular home, setting the elements together in the required way. This does not mean to take a window here and a roof there, but adopting and transforming existing ideas how to tackle current questions related to a quality modern home, which is equally created by architect and user.

¹ borrowing the word of Henri Lefebvre, describing his understanding of space

Home-making

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Introduction

Prefabrication for collaboration

Unlike molecular biology or information technology, everybody deals with architecture. But where do the “giver”¹ and user of architecture directly meet, where do their realms intersect? – In the design of the house, the individual home. Although the answer to the preceding question seems obvious, it is not as clear to say whether modern architecture² in particular has actually reached people at home. On the contrary, is it not confined to residential one-off solutions, public buildings like museums, galleries or libraries as well as popular events and exhibitions like the EXPO?

In order to explore ways of opening up modern architecture to a wider audience, my report investigates the dissemination of its idea(l)s by *the* architectural instrument itself – the house³. It is especially the prefabricated house, where the user’s contribution to the design process plays a decisive, but very particular role. The use of prefabrication for housing looks back on a historical development; yesterday’s pattern book is today’s customised CAD software. I cannot lay claim to this initial thought as an original idea, since it was a truly modernist project to find means and ways of bringing architecture to the man. Parallel to experiments with prefabrication technologies in early modernist architecture, the commercial housing market and pattern books developed – and succeeded. In former times and our own, the two strands ‘architectural’ and ‘commercial’ occupy separate territories.

One of the few recent British studies on the topic is *The prefabricated home* by Colin Davies. The author argues that the prefabricated house possesses the potential to provide architecture with increasing influence on housing, “it could become architecture’s ally”⁴. Against the background of this idea, my report explores the definition of ‘design’ as triologue between the parties architect, user and building industry. My aim is to find fruitful collaborations of three equally active participants, each contributing their own skills and possibilities.

Hearing the word ‘prefab’ or ‘Fertighaus’⁵ makes every architect shudder. With the expression arises a complex set of images, notions and biases which demonstrate the ambiguous reputation of prefabricated housing. And the architectural profession is not the only opposition: despite its success in popular housing, there are strong reservations on the user’s side as well. In PART I, I therefore investigate this peculiar reputation of prefabrication as well as the ideological ideas behind it. Concepts of dwelling and living in architecture and society need to be portrayed and penetrated.

To shed light on an encounter between architectural theory and practice as well as architect and user, I will approach the prefabricated house from its two different sides: the architect’s side – the characteristics, beliefs and position of the profession, and the user’s side – his demands, desires and needs. Interwoven with the design process of a house is the discussion of ‘home’, with its controversial physical and metaphorical meaning. I designated ‘design’ as a triologue which addresses the field of participation in architecture. Through looking at theories on participation and self-build projects, I aim to go a step further –

¹ David Stea, in: R. J. Lawrence, *Housing, dwellings and homes: design theory, research and practice*, p.xi

² ‘modern’ always means ‘contemporary’ here; I do not differentiate between architectural trends of the last ten years

³ Andrew Ballantyne, ‘In a dark wood: dwelling as spatial practice’; in: *arq*, 2000, no.4, pp.352-353

⁴ Colin Davies, *The prefabricated home*, p.129

⁵ literal translation: “ready-made house”

towards possible applications today. I am seeking for a vital link between participatory strategies and the use of prefabrication within current ideas and practices.

What interests me of the topic 'prefabrication' is its very particular societal meaning; I therefore focus on the architectural and social context, diverting to essential political and economical issues. Since exhaustingly done, I will give only a brief historical outline. With relation to its history, it is nevertheless important to point out terminological characteristics of the 'prefab' / 'Fertighaus', which already indicate the inherent tension between "architectural" and "non-architectural" principles.

To assess the thoughts and theories of the first part on a practical level, I selected types of prefabricated houses and tested their potential to provide a quality contemporary home as well as the user's participation. Thus, PART II contains a 'catalogue' of projects developed recently. My choice of case studies (with one exception) concentrates on the situation in Europe where prefabrication has played a very different role than in the USA or Japan. I can also not speak of 'the European prefab', but have to consider regional peculiarities as well as general urban issues. The prefabricated house on brownfield land obviously differs from the mobile rooftop unit. As a native German in England, I naturally focus on developments within these two countries.

There is extensive material about the history of prefabricated housing, its technology and construction, but very few speak about its particular reputation. Literature about the commercial 'prefab' / 'Fertighaus' does not seem to belong to the domain of the architectural profession. Architectural magazines publish one-off solutions, but they do not cast attentive eyes over the common prefabricated house; this is allocated to magazines or books on home-design.

Active participation has a different societal significance today than during its heyday in the 1970s and 1980s, when it distinguished by its radical energy – to act differently and especially to *be* different⁶. However, the related aspect of ecological building has become increasingly important and in vogue again. In the late 1990s, the user was discovered by architectural history and theory, but introduced by disciplines like geography, sociology or anthropology. Thus, the combination prefabricated house – user – architect – industry is a very recent and still uninvestigated field.

Therefore, my aim is to gather the dispersed pieces of information from various fields and disciplines, as well as to collect and confront controversial opinions, and putting the fragments together, I propose to look at the prefabricated house from a new and different angle. Furthermore, I attempt to bridge the gap between theory and practice of prefabrication and participation by portraying findings of both. My report would succeed, if readers could resort to this new compendium for practical action. The point of view from which this report is written – from an architect within the profession – is on the one hand clearly biased, but on the other hand it is using an insider's knowledge to stir established conventions.

home-design
with many thanks to Julian!

⁶ the origins of participation in the 1970s need to be seen against the background of the 1968-movement as a counter-movement to the bourgeois society and the so-called establishment

PART I Concepts

Wohnst du noch oder lebst du schon?

Live your life, love your home. **IKEA®**

Prefabrication

Brief sketch of a longer history

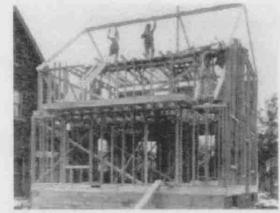
To trace the history of prefabrication back to its origins, you might start in medieval times. One narrative tells of William the Conqueror who brought a prefabricated timber castle from France to England in 1066, to make himself comfortable in the new home country. Apart from this adventurous example, the technology of prefabrication for housing on a wide scale evolved in the nineteenth century.

In 1833 the 'balloon frame' was invented by a carpenter in the United States⁷. The walls of a balloon frame are composed of building-high (up to two floors) timber posts, 400mm in distance, held together by beams at the top and bottom. The same pattern is used for the floor(s); roofs and cladding vary. The invention of this straightforward construction technique was of essential significance for Northern America, supporting the uncomplicated and fast settlement of the young country. Modular⁸ constructions used today are often derivatives of the balloon frame.

The commercial sale had been firmly established with the invention of pattern books and mail order catalogues for the type of houses available from the company. The leading US company in this branch was Sears, Roebuck & Co, founded in 1908. It offered conventional, regional design, implemented with highly innovative technology for production and construction, and sold by an effective marketing system. Sears Roebuck manufactured pre-cut timber elements for the frame as well as windows, doors, cladding and covering in their factory. The components were bundled into kit packages, including framing plans, nails, paint, and delivered to each building site. The house could be erected in a couple of hours by skilled builders, but equally by a layman, with slightly more time spent. Machine-production for a house was similar to the technology of early car manufacturing; the idiom "producing a house like a car", which repeatedly arises nowadays, was founded.

The type I am investigating and writing about came to life in the early twentieth century, simultaneously with modernism and its fascination of growing industrial mass production. Although the modernist type of prefabricated houses adopted ways for construction and production, it ran parallel to the industrial development. The discovery of prefabrication by architects reveals an essential modernist question: How do you make beneficial use of modern technology and economy? It was to develop an architecture which expressed the machine age and which at the same time liberated people from 'unhealthy' dwelling and living conventions. Modernism followed the social utopia to reform life by making functionalist architecture accessible for the masses – from above.

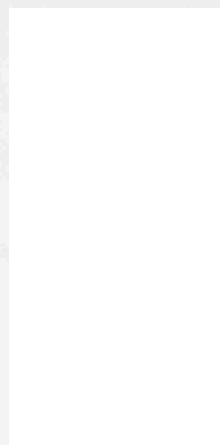
Modernist projects dealing with prefabrication became particularly famous among the architectural profession and even beyond. Le Corbusier's *Maison Citrohan*, Gropius' *Packaged House*, developed together with Konrad Wachsmann, Wright's *Usonian House*, Buckminster Fuller's *Wichita House*, the Eames' *Case Study House*, to name just a few. Colin Davies summarises: a history of "either failures or non-starters"⁹. Prefabricated houses designed by architects were



balloon frame construction, 1935
(www.nbm.org/blueprints/90s/winter94/page2)

⁷ Colin Davies, *The prefabricated home*, p.44-46

⁸ 'modular': factory- or site assembled, structural volumetric unit, consisting of a room, a part of a room or a set of rooms; transportable size, stackable on site



Sears Roebuck catalogue, 1926
(In: Colin Davies, *The prefabricated home*, p.52)

⁹ Colin Davies, *The prefabricated home*, p.44

distinguished by their experimental character. What the projects lacked though was a true economic thinking, going further than design and construction, and including the aspect of marketing alike. In actual fact, the heroes of modernist architecture bore a distinct reservation of bending down to industrial and commercial principles. Thus, the modernist prefabricated house never reached the masses, which it was actually designed for.

The colloquial English expression 'prefab' evolved after the Second World War and became a popular term especially in the 1960s. England made extensive use of the straightforward modular structures to manage the enormous demand of post-war housing. The post-war 'prefab' was never planned to last for long; it was built as temporary public housing. Equally temporary was the life of the producing industrial companies and their technologically advanced systems¹⁰.

It was not only a British realisation that prefabrication was most suitable for the supply of a gross number of dwelling units. Where the characteristic (prefabricated) post-war housing in England was the single-family home, in Germany it was the multi-family block. Industrial assembly-line production was an efficient way of building social or affordable housing; the production was fast and cost-effective, durability and spatial dwelling quality was generally not the main goal. In fact, these typical post-war blocks still mark many European cities. Though the disparaged 'Plattenbau'¹¹ moulded a particular image for building with prefabrication: in the public view prefabrication is often equated with (Eastern European) socialist housing, deterring dimensions and inhuman uniformity and not with the actually progressive construction.

The prefabricated house type of the 1970s was the 'mobile home'. This peculiar form of trailer or caravan, a hybrid of vehicle and house, again was a typical US phenomenon. The growing popularity of holiday residencies made the mobile home a success story. Originally built for temporary use, it was developed to become a permanent dwelling, uniting the desire of an un-rooted, nomadic life and an efficient way of building. This is the reason why the mobile home reappears as model for several recent prefabricated dwelling units in Europe.

When the word 'prefab' is used today, it is understood as a loose term which summarises various kinds of constructions. 'Prefabrication' as an overall term comprises 'system building', 'modular housing', 'mobile homes', 'kit systems' or OSM¹² which has become the expression used most frequently. Except for the term 'mobile home', these are fairly neutral expressions, stemming from the way a house is constructed, and declaring nothing about the end-product.

In contrast to the German equivalent 'Fertighaus': the 'ready-made' house. What makes this term peculiar is its contradiction in terms: although it advertises a high scale of individual user input, it is named 'ready-made'. If the living urban environment and the home alike are in continuous change and diverse, "how can houses ever be ready-made?"¹³ They can when 'ready-made' is understood as part of the process only. If a homebuilder opts for a commercial 'Fertighaus', he will not be excluded from the design, but mainly from the actual building process, receiving the ready-made product in the end. Making prefabricated components available for designing a home, offers a wide range of possibilities for architect and user alike, but as the term 'Fertighaus' already indicates, there is sufficient cause for vigorous protest at the same time.



Le Corbusier's *Maison Citrohan*, 1920
(<http://blog.uncovering.org/archives/2004>)

¹⁰ for example AIROH (Aircraft Industries Research Organization on Housing) or BISF (British Iron and Steel federation)

¹¹ "building made of precast concrete slabs" (ill. p.24); built on a wide scale in Eastern and Western Europe in the 1960s

¹² OSM: 'off-site manufacture'

¹³ Stephen Rahe, 'Fertighäuser oder Fertigteile?'; in: *Architekt*, 1996 Apr., p.238

English post-war 'prefabs', 1994
(in: Brenda Vale, *Prefabs*, p.4)

"Architectural" versus "non-architectural"

The historical outline suggests that the development of the prefabricated house is split into two parallel strands: on the one hand the modernist - and on the other hand the industrial, commercial type. Seen from the architect's point of view, the prefabricated house falls into the "architectural" category or the "non-architectural" category - and simultaneously out of the canon.¹⁴

The historical modernist type did not succeed, to a larger extent because of either misunderstanding or consciously denying the rules of industrial production, as well as the forces of the market to which it is subject. Colin Davies remarks that the early modernists tried to turn 'industrial' into a certain kind of 'vernacular', a pure, factory-made roughness which would speak the language of the time and its people. Instead, they had to disappointedly recognize that mass production was more likely to create "tasteless tat" instead of the industrial "natural beauty"¹⁵ they hoped for.

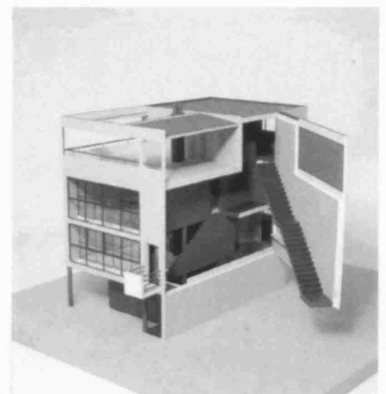
The "architectural" prefabricated house was developed with an abstract, idealised user in mind, whose real needs and wishes had not been honestly investigated. Concealed behind this attitude, there may have been the urge to set architecture that stands apart from low-level consumption and taste, what can be explained with an ambition to keep the standard high. But on the other hand, it is this authoritarian attitude of predefining the user's needs according to his notion, on which the architects' reputation of unworldliness and arrogance is founded. The user of "architectural" prefabricated houses was still the individual client or patron, but not the anonymous customer of the commercial market. Thus, the modernist types were one-off solutions, individual and unique, rather than industrially marketable. Nevertheless, in terms of architectural qualities, they set the standards for recent projects.

It is an intricate task to define "architectural", but there are key elements which outline the professional notion. It is the idea behind a design, an overall image, which determines the concept for a building. An optimal concept succeeds in considering the specific demands of site and inhabitants - which basically means that every design starts from the scratch. Aesthetic questions of proportion and tectonic play a decisive role to create a distinctive form. This built form evolves from the requirements of the project, summarised within a brief, but equally from the personal signature of the architect. A spatial logic and order determines the abstract quality of a building which lies in the ease of sequences of movements, and the excitement of spatial perceptions. Views, light and material, down to the delicate execution of joints, are instruments to achieve this.

It is the abstract quality of space and its perception which makes the definition of "architectural" intricate. This also implies the main distinction to the "non-architectural" category which is determined by robust criteria. The keywords for the commercial prefabricated house are 'efficiency' and 'service' - a good price for a quality product, fast manufactured and sold in a customer-friendly way. The house's value is not defined by a unique form, but whether it is marketable. Consequentially, a form does exist in advance.

¹⁴ Colin Davies, *The prefabricated home*, introduction

¹⁵ *ibid.*, p.13-14



model of a *Maison Citrohan*
(www1.uol.com.br/bienal)

“Non-architectural” prefabricated houses are usually timber constructions¹⁶ combined with modern technology, so that tradition and innovation merge within building structure and services, but the house’s face still looks conventional. There is a variety of flexible, adaptable standard models, meeting the wider audience with no individual, but the market’s customer profile. What was sold by pattern books in former times is now offered and branded via the internet or glossy catalogues. Customised CAD software enables the potential homebuyer to compose his putative dream home with several mouse clicks online.

The typical light-weight building structure has always been a reason for prejudices against the prefabricated house, among the user as well. There is a general equation of ‘prefab’/ ‘Fertighaus’ with ‘cheap and mass-produced’. Members of the bourgeois middle-class in particular have pleaded for a massive-built house¹⁷ and rejected the ‘Fertighaus’ as flimsy, instable construction – most probably not despite, but because of, its success in popular housing.

So, who buys the prefabricated house today? Skimming through the catalogues of commercial firms, it becomes clear that the customers are not limited to a class anymore. Increasingly addressed is the middle- and even high-income homebuyer alike. What I depicted as “architectural” and “non-architectural” here are two extremes opposing each other. Within the intermediate space there are many firms and house types which oscillate between the two fields, attempting to merge elements of both. As architects try to get a hold on industrial production and customisation, commercial firms conversely try to gain the attribute ‘architectural’ for their products. Nevertheless, the demarcation is kept alive.

¹⁶ five basic constructions: half-timbered-, post-and-beam-, frame-, skeleton- and panel systems

¹⁷ the so-called ‘brick-and-mortar tradition’



Musterhausausstellung Wuppertal
(by author)

Encounter of architect and user

Architects' culture and user worlds

By dealing with both ends of building, the architect adopts a bipolar position. He is creator and equally user of homes, he is within the architectural field as well as everyday life. Transferred to the level of urban space, Jeremy Till, an architect himself, designates him as “expert-citizen/citizen-expert”¹⁸. But in the reality of building, the architectural profession is a fairly secluded sector, pointedly compared with a “cultural microcosm”¹⁹. My own definition of “architectural” exemplifies the use of a characteristic vocabulary – it is architectural in itself. This jargon is expected and understood among members of the profession, but it is foreign to and not - or misunderstood by a non-professional. The essential architectural means of drawing and model can be equally impenetrable as these professional codes.

The abstract character of key elements in architecture has moulded the professional “belief system”²⁰ from early modernism on. On the other hand, designing and building has always been a social interaction – between architect and user and between a new edifice and the existing built environment. Within this reciprocal process, architects have established their specific “culture of practice”²¹. Part of this culture has traditionally been the prerequisites of a client, a brief and a site which formed the basis of a unique building. Despite its social bond, modern architecture appears alienated from most of its users and their homes and, in contrast to the ‘cheap prefab’, is generally equated with expensive building and a bourgeois core, “choosing haute couture over prêt-à-porter”²². Is it in fact, an elite discipline with no access to/for the wide public?

The view from inside reveals that, in a sense, the architect is obliged to fulfil the demand of a universal genius. Dana Cuff describes four dialectical dualities of architectural practice, and the architect in-between the individual – the collective, design/art – business/management, “decision making” – “making sense of a situation” during the design process and a “mosaic of specialists” – “qualified generalists”²³ for the execution of the latter. The tension between belief and practice, ideology and action becomes graspable. The architectural education in Western Europe is usually oriented to design/art; gaining knowledge in construction, technology and business is deferred to the architect’s future working life. However, the concentration on artistic abilities remains a source of conflicts. Aesthetics and art are comparatively hard to make profitable²⁴, since they possess an abstract value which evades the typical economic evaluation criteria. Cuff concludes that “architects themselves live with this discrepancy; their tacit coping produces what I have called the culture of practice”²⁵.

Right now, the architectural profession is in the process of changing, but the elusive ‘new paradigm’ is still asked for. Abandoning the universal genius, architecture has transformed into a service sector: the architect acts as mediator between the user and contractors, building firms or public organs. He coordinates the various elements which compose a building project. Computer technology is often addressed as a booming new field for architects’ involvement; digital systems offer a high potential for developing new methods of designing and

¹⁸ Jeremy Till, ‘The negotiation of hope’; in: *Architecture and participation*, p.30

¹⁹ Dana Cuff, *Architecture: The story of practice*, p.157

²⁰ Alan Lipman, ‘The architectural belief system and social behaviour’; in: *British Journal of Sociology*, 1969, no.2, pp.190-203

²¹ Dana Cuff, *Architecture: The story of practice*, p.56

²² Witold Rybczynski, ‘Housing without architects’; in: *Architecture*, 1997 Aug., p.80

²³ Dana Cuff, *Architecture: The story of practice*, p.11

²⁴ German building regulations (HOAI) distribute 11% of the architect’s salary for a building to design work

²⁵ Dana Cuff, *Architecture: The story of practice*, p.262

building – also for the prefabricated house and for the collaboration of architect, user and building industry.

The house is not only a human need in physical terms – as shelter. In the form of the home, it serves as object of identification – as symbol. This symbolic value involves architect and user alike, but with distinctly different meanings. For the architect, as “giver”, it is the idea for a building *providing* a home, but for the user it is the notion or rather the feeling of *being* at home. This longing for a private home reveals strong bonds to traditional values, being fairly unimpressed by the changes to modern life. Conventional housing speaks its own, namely domestic, language, as modern architecture does, but in contrast to the latter, the language of the conventional house is understood by a majority of people.

Opposing the emotional and metaphorical level, there is the matter-of-fact economic reality. A house is not only shelter and symbol, but a market product and investment alike. Economic factors clearly influence and limit the capability of the user to shape his home. Calling a house a market product, turns it into a member of consumption, and here the prefabricated house appears again. First of all, a homebuyer of the conventional ‘Fertighaus’ is a consumer and therefore a customer of the housing market. The innovative house seller “must anticipate consumers’ demands”²⁶ who shop for a house as for a dress.

architect-user intersection
(*Re-Vamping*, Serpentine Gallery Pavilion, 2006;
author)

²⁶ Witold Rybczynski, ‘Housing without architects’, in:
Architecture, 1997 Aug., p.81

Home-making

Metaphors like the 'safe haven' or 'my castle' portray that the home remains the "most intimate unit of the built environment"²⁷. It embodies the sacrosanct refuge of modern man from the outside world. Dwelling as activity turns a house into a home, turns a rootless commodity – like a 'Fertighaus' from the catalogue – into a place. This place, as a unity of fixed location and individual space, is endowed with significant personal meaning. As it is the architect's aim to place his signature onto the house's design, it equally is the inhabitant's to materialize himself within his home. He therefore appropriates the given object, be it an architect's or a commercial house, and expresses his personal identity by the interior design, since in most cases he has less influence on the exterior walls. "Show me how you live and I will tell you who you are"²⁸, says the German vernacular voice.

"... How very little, since things were made, things have altered in the building trade," says Rudyard Kipling²⁹ and points to established dwelling traditions, colliding with innovations in technology, economy and society. We conserve our idea of dwelling as a "solid notion with mobile walls"³⁰: on the one hand, the home is invaded by modern devices and practices, on the other hand it embodies needs and desires as old as humanity itself. For the standard prefabricated house in particular, the contradiction lies in the advanced industrial production of its components and the conventional outfit of the end-product. Consequently, human dwelling practices would not need to be re-invented, but rather re-interpreted towards a contemporary, positive use of innovation.

Since at present, the ideal of the single-family home, architectural leitbild for centuries, is dissolving. There are diverse new life and dwelling models today: flexible, nomadic, the autonomous single "which collectively seeks to achieve individual happiness"³¹, a growing elder population, migrants, unemployed. The old industrial society transforms into an information society; individualisation and globalisation are the themes of the day. The multitude of changes stands in contrast to the static, reactionary character of dwelling. "Does the age of flexibility need a new architecture of mobility?"³² – this seems to be a sensible question to ask. The "consumption-oriented prefab for one phase of life"³³ may offer an answer.

The well-known term 'the prefab off the peg' / '- von der Stange' reveals the close connection of prefabricated housing to fashion. Clothing as well as the home can define whether one is 'fashionable' – within the (main)stream, but still distinctive and individual. "Like clothing, the dwelling can serve a private self-portrayal (...)"³⁴, although an incomplete one: the individual act is limited to choice and composition of available clothes. Nevertheless, the concept of mass customisation enables the prefabricated housing development to actively involve the user in the design process.

Mass customisation is based on an unproblematic adaptation to customers' wishes and the use of automatised fabrication technologies. The background in fashion industry – the human figure – is topologically similar, yet in

²⁷ Judy Attfield, *Wild things: the material culture of everyday life*, p.152

²⁸ Original saying: "Zeig mir wie du wohnst, und ich sag dir, wer du bist."

²⁹ *A Truthful Song*, 1910

³⁰ Robert Kaltenbrunner, 'Wohnwelten, Denkwelten'; in: *archithese*, 2003, no.4, p.13

³¹ *Périphériques, 36 propositions for a home: results of a call for ideas*, p.iv

³² Hanno Rauterberg, 'Rolle vorwärts'; in: *ZEIT online*, 2001, no.21

³³ publishers, 'Housing programmes', *archithese*, 2003, no.4, p.2

³⁴ Judit Solt, 'Wohnungsbau für wen'; in: *archithese*, 2003, no.4, p.38

Andreas Gursky, *Paris Montparnasse*, 1993 (in: *arch+*, 2001 Dec., p.43)

most different variations. Therefore, prototype models, consisting of variables and parameters which describe the relations of the measures to each other, are manufactured. The key principle is “to assist the customer with deliberate forms of participation so that he can bring in his needs and wishes, without being overcharged by the possibilities of choice”³⁵. The transfer to architecture lies in a mixture of predetermined and flexible parts. Within a fixed framework given by the architect, the user is able to define his house according to adaptable parameters. To ease his involvement, the possibilities of deviation are limited, but equally the scale of complexity is reduced. The architect’s signature remains recognisable.

³⁵ Oliver Fritz, ‘Bauen mit Computern’; in: *archithese*, 2003, no.2, p.47

Today’s “individual mass production”³⁶ has replaced the former industrial mass production. Nevertheless, the inherent contradiction of the term points to the tension between the individual and an anonymous market. The ambiguity of turning one of innumerable same articles of a production line into a unique, personally meaningful object has been a reason for modernist architecture to refrain from mass production. Home as a product has to be compatible to the market. There is the danger of reducing the inhabitant to the abstract category of the customer, to be provided with data and technology, by economy, politics and finally architecture. In the worst case, sensations of dwelling and living give way to a superficial appropriation of products, dictated by the rules of consumption. However, reality may lie in-between the inevitability of market forces and the need to subvert these.

³⁶ Florian Böhm, ‘Die Suche nach der Vielfalt’; in: *archithese*, 2003, no.2, p.57

Joint action – participative design

Mass customisation is offered as a way for the architect to get into touch with the biggest group of potential customers/clients and simultaneously, the latter is able to participate in creating his home. Is this then a sensible way to a “shared authorship”³⁷ by architect, user and the industry? The current ratio of privately built homes in England is only 20 per cent.³⁸ The proportion in Germany is higher, but still negligibly low, compared to 98 per cent of houses from the catalogue³⁹, leaving only two per cent for the traditional architect-client design. The last figure demonstrates that low-cost building needs to be seen as a challenge for architecture, its limits as increasing quality, not diminishing it. What the figure does not tell is of what kind the most popular house from the catalogue is. In any case, its design process is regarded as strikingly different from the one creating a traditional architect’s house.

Strictly speaking, any design is an interaction, “a social process”⁴⁰, making the relationship between the participants its most important feature. Judy Att-field explains that the act of designing creates meaning through endowing things with a certain attitude. In demarcation from Fine Art which enchants the ordinary object world by making it special, but distances it from the individual person, design disenchants it and makes objects graspable, accessible. A special object-subject-relationship is built, deriving from the appropriation of and identification with an object. In contrast to purchasing an object of consumption, which conveys the feeling of capitalistic possession. Since the market also produces the meaning and value of objects, it can seduce the customer to passively adopt them as his own. Thus, the difference between an active identification process and a more passive act of purchase becomes clear. This active identification is the basis of building projects founded on participation. With the user’s own physical and mental input into his home a very personal and responsible attitude towards his built environment is initiated.

What does ‘participation’ mean against the background of architectural practice in general and prefabrication in particular? Jeremy Till first of all distinguishes between very different forms, from pseudo to total-participative actions. In architecture, the key lies in the golden mean. What Till calls “transformative participation” acknowledges “imbalances of power and knowledge, but at the same time works with these imbalances in a way that transforms the expectations and futures of the participants”⁴¹. The architect seeks the contact with everyday reality, which means a positive threat to the profession because it questions normative architectural traditions. As creator and user in personal union, he is working “from within”⁴² the actual context of his occupation. Similar to Dana Cuff, Till demands for making sense of a situation, but *best* sense, not common sense, crediting a special social situation. The architect has the admittedly difficult task to accept and work with the natural contingency in architectural production.

So far this is the theory, and how does this transfer to reality? Juxtaposing Jeremy Till’s theoretical idea on participation with his practical work reveals

³⁷ Colin Davies, *The prefabricated home*, p.99

³⁸ *ibid.*, p.8

³⁹ according to the German newspaper *Die Zeit*

⁴⁰ Dana Cuff, *Architecture: The story of practice*, p.248

⁴¹ Jeremy Till, ‘The negotiation of hope’; in: *Architecture and participation*, p.27

⁴² *ibid.*, p.32

Arnstein’s ‘Ladder of Participation’
(in: Jon Broome; *Architecture and participation*, p.65)

the intricacies. An analysis of his house-office building in London-Islington (with Sarah Wigglesworth) finds an artificially 'built' theory, "the dynamic of the everyday life itself being designed"⁴³. The reason for difficulties in transferring theories into practice may be that research on the user of architecture is a young field in architectural history and theory. The user is no new figure in architecture as such, since the classical participation movement of the 1970s and 1980s even nominated him the key figure. However, the movement's achievements did not occupy the academic discipline until recently.

⁴³ Nicolas Pople, *Experimental houses*, p.19

Artist and architectural historian Peter Sulzer describes elements of a classical participation project in practice. Before the architect steps into his characteristic role of coordinating the different parties of a building project, his main task is to set up a solid basic structure to work with, initialising a discussion with the user. This structure resembles the example I gave for mass customisation in architecture; here, it mainly consists of a basic order of required spaces. An architect, guiding a self-build project, has to keep the authority for the overall concept and concerning building regulations. "As architect you must insist on some things: to discuss everything would drive you crazy."⁴⁴ The actual brief is composed in close collaboration of architect and user. What is often underestimated by professionals is the illegibility of their drawings for the user. Logical consequence is the use of a three-dimensional visualisation, a 1:1 model at best – think of a prefabricated model house.

⁴⁴ Peter Sulzer, 'Notes on participation'; in: *Architecture and participation*, p.151

Nevertheless, there is Jeremy Till's "threat" to the profession, namely the open process and end as well as the loss of absolute control for the architect. A truly participative project is characterised by a spontaneous, unpredictable interplay of predefining, deciding and letting go for the architect as well as restrictions, compromises and suffering for both. "Self-builders make decisions, and if the architect's arguments are not strong enough, they decide instead."⁴⁵ The architect turns into a leader with changing amount of responsibility; but he must develop a way of concealing his leadership from the user. By making use of professional knowledge and influence, the user needs to be conveyed the feeling of self-creation at the same time: "As architect you have much work to do behind the scenes, which you never show to the users."⁴⁶

⁴⁵ *ibid.*, p.156

This insight into the reality of self-building confirms Till's assumption: total participation in architecture is not possible. A solid architectural framework appears essential for further appropriation by the individual user – a basis where "(...) people can do their own thing, because they're going to do it anyway"⁴⁷. Furthermore, the user can comment on suggestions of the architect more easily; providing him with a blank sheet of paper might not be fruitful. When asked for wishes or needs the user often offers very practical and fundamental – 'ordinary' – answers. Before designing *Bo Klok*, IKEA undertook a survey among potential customers and received the wishes for a safe environment, garden, light spaces, natural materials, high functionality and a good cost-performance ratio. These must not be disregarded, but most probably do not provide sufficient inspiration for a good design.

⁴⁶ *ibid.*, p.155/156

⁴⁷ Judy Attfield, *Wild things: the material culture of everyday life*, p.200

Regardless of its benefits especially on a social level, even coordinators of participation projects admit that "self-build is not for everyone"⁴⁸. In demarcation to the academic discipline, self-build architecture has developed as a field on

⁴⁸ Jon Broome, in: *Architects' Journal*, 1988 May 4, p.83

its own, as the legacy of Walter Segal or the development in Southern Germany around Freiburg has proved. It is related to ecological building and alternative design, associated with the green movement. Moreover, participation is realised in urban planning, rather than in individual housing projects. The latter will always be a group project, executed within fixed social institutions of associations or cooperatives, not one for a single home. Self-build schemes adopt only a small proportion of the housing market today.

Peter Sulzer's realistic valuation considers that participation does not provide "the solution to world problems"⁴⁹ whereas radical advocates like Lucien Kroll still believe that friendly architecture creates friendly people⁵⁰. Each participation project is different and unique and not to be seen as generally valid scheme, but rather as an adaptable idea and system. The best example in this respect is *The Segal Method*⁵¹, which Walter Segal invented particularly for self-build projects. The straightforward construction consists of a modular grid for post-and-beam timber frames, the walls are made of standard plasterboards. Segal's heirs like Jon Broome still use his system for their projects.

Are there ways of benefiting from the findings of participation theory and practice for further use of prefabrication? The reason for reservation towards participation among architects is first of all the surplus of work. Accepting the openness of the entire process and being flexible to work with this spontaneity is not what many architects can or want to spend their energy on. The characteristic interplay of authority and compromise leaves space for the fear of the ordinary: perhaps, the user is capable of down-grading the design in the end. There is the architect's aversion to bricolage, composing a home by copying, cutting and pasting without considering the overall composition. In the words of an architect: "I try to make it clear that picking and choosing is not in order. All I want is reactions; a good building isn't a collection of bits and pieces,"⁵² – which is exactly what a 'prefab' is.

⁴⁹ Peter Sulzer, 'Notes on participation'; in: *Architecture and participation*, p.149

⁵⁰ Lucian Kroll, 'Animal town planning and homeopathic architecture'; in: *Architecture and participation*, p.183

⁵¹ "It was not a building system: it was a method."; P. Sulzer, in: *Architecture and participation*, p.150 (ill. p.51)

joint family action, Lewisham project, 1980
(in: *Architects' Journal*, 1986 Nov.5, p.35)

⁵² in: Dana Cuff, *Architecture: The story of practice*, p.187

PART II Implementations

"Prefabrication is all things to all men, and a source of confusion to many...

Its basis is not so much a logical theory as a cult. And as a cult it has won ardent and persuasive adherents, united by a belief in a better house, for less money, through more efficient methods of house production."

Bruce and Sandbank, 'A History of Prefabrication', 1944

in: Allison Arieff and Bryan Burkhart: *Prefab*, p.20

Catalogue

Introducing words

Traditional building is turned into “building systems”⁵³, which merge design, construction, production, logistics and montage into a holistic project. Not a client, but the planners themselves initiate these projects, approaching a new type of housing market. Building sites transform into “montage sites”.

This is still a future scenario, but nevertheless there are various recent projects which understand the versatile possibilities of prefabrication for a contemporary home. In this second part of my report I will demonstrate some of those projects, which are to complement the theoretical concepts in PART I. Instead of concentrating on a few examples, I have decided to present a range of different attempts which reflect what is on the market and in the media today: it serves as a catalogue of the recent state of affairs. Key criterion for selecting a model was the participation of architect, user and industry. However in most cases there is a partnership between only two of the three participants. Developing a project with the “trialectic”⁵⁴ creatorship as basic concept is the exception rather than common practice.

The five categories *social-public*, *commercial*, *nomadic*, *adherent* and *conceptual* derived from the range of models I selected. Their characteristics evoke questions of availability and target groups (social), policies of supply, support and steering instruments (political), marketing and branding strategies (economical), constructional systems, spatial and aesthetic quality (architectural) and finally, the situation in the built environment (urban). The categories are permeable and overlap, there is no strict demarcation. The affiliation to a category is defined by the model’s most decisive feature, but it might fulfil the criteria of another category as well.

To enable the reader a quick overview and comparison of the models, I set up a tabular evaluation. At one glance the varying degree of user participation becomes obvious and a comparison of time and costs shows the economic efficiency. However, a comparison of costs is difficult, because it is often not clear what published prices contain. For the commercial prefabricated house, they normally refer to standard versions, but the final price depends on the customer’s composition in the end. Therefore the costs listed here give an approximate figure only.

With the following collection of prefabricated houses I do not intend to present the ‘Top Ten’ in the field. All models on display contain valuable components with potential for a future application, but they are not perfect solutions which have already solved the main questions of my report. On the contrary, I compiled this catalogue as a source from which numerous elements for an open ‘toolkit’ can be extracted.

⁵³ “Bausystem”
Thomas Bock, ‘Leichtbau und Systeme’; in: *Detail*, 2006, no. 7/8, p. 757

⁵⁴ term by Henri Lefebvre;
in: Iain Borden, *Beyond space: The ideas of Henri Lefebvre in relation to architecture and cities*, UCL material, 2006, p. 2

tool-kit for a home
(flo house, Piercy Conner architects; in: A. Arieff: *Prefab*, p. 139)

1. Communal housing – social-public

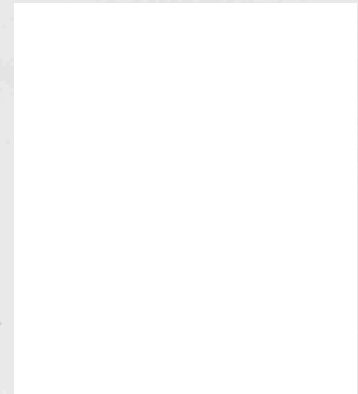
Communal housing projects can mean either the least or the most user participation. Public, municipal developments usually exclude the user from the design and building process, whereas self-build projects are based on his mental and physical contribution.

What is typical for housing in the UK is rather untypical for the continent: the British housing market is based on speculative supply, instead of actual demand. Public and private developers build for potential customers to whom they sell ready-made dwellings, instead of offering design proposals which involve a consultation process with the customer/client, as it is common in Germany. So, what homebuyers want is what they can get. 'Efficiency' becomes a keyword for this kind of projects: the requirement to build fast and cost-effective, price, time and location, are the highest priority. Homebuyers are wooed with financing models like mortgages or shared equity.

Opting for prefabrication in this context is mainly an economic decision, since industrial constructions are predestined for large-scale buildings which are composed of a number of same or similar units. The economic aspect is of even higher significance where a municipality provides social or affordable housing for target groups like keyworkers. Therefore projects which join in fighting the current housing crisis in the UK are rewarded with financial funding and wide public interest – the amount of press release on Raines Dairy exemplifies this. There is no such propelling of prefabrication in Germany, where cities have to cope with a growing over-supply in housing instead, resulting from miscalculated demand in the 1990s after the reunification and a decrease in population. The slogan *Shrinking Cities* conveys a clear image of the situation.

If not worth mentioning for involving the user, it is worth noting that public communal housing projects collaborate with industrial firms which start paying more attention to architectural questions. Corus, an Anglo-Dutch steel-producing corporation, is an appropriate example. The company employs its own designers, architects and structural engineers. Apart from joint ventures with large house builders, Corus works with architectural firms as well, for instance supplying customised wall panels or floor cassettes. Two years ago, the company initialised its own off-shoot manufacture of the modular units *Living Solution* and *Junior Ranks Single Living Accommodation*. The OSM process equals car production in terms of scale and economy. Unlike producing bespoke buildings, Corus works with bespoke production: computer-controlled standardisation allows small-scale production lines. Thus, prefabrication does not necessarily mean mass production anymore, as it was in the industrial era – which obviously caused conflicts for individual housing and modernist architecture alike.

Self-build projects like the Lewisham scheme with Walter Segal are a counter-example in terms of user participation. They are eligible for my first category *communal housing* because participatory projects are always executed for a number of people, but these projects' characteristic is that they are executed by the people themselves. However, the opportunities of prefabrication for



'WBS 70' block, Eastern Germany
(in: *archithese*, 2003, no.2, p.16)



modular unit by Corus
(www.coruslivingsolutions.com)

simplifying the building and cutting costs are not sufficiently utilised yet, or still mistrusted when Kroll says that “(...) prefabrication has never been cheaper than the hand-made, even if tomorrow that could change”⁵⁵. In case prefabrication is included, factory-made *components*, but never whole units are used. Thus, the union between architect and user does exist, but the link to industrial production systems is not essential or even in various cases, missing.

The projects I therefore chose are not ‘self-build’ in the original sense of the word because they diverge from the self-build canon in some respect. Broadway Estate is called ‘self-assisted’, since it involves the user to a limited extent only – in the building process, but not in the design. The development of a vivid urban neighbourhood was the key aim for the Settlement Lessingstraße under which all other issues were subordinated. The architect remained responsible for every overall planning and design question. Both projects applied prefabrication in a particular way: prefabricated elements were site-specifically chosen and newly composed. It was not the ambition to use as much standardised components as possible.

The two projects demonstrate an aspect which the expression ‘self-build’ itself ignores: The actual design and building process is a singular action of the first generation of users. Depending on the (in)flexibility of the disposition of space, it can be difficult for the second user to alter the house and transform it into his home. In economic terms the re-use and re-sale value is diminished. That a house will most probably change its inhabitants at some point, gains a special meaning for homes built on the basis of a maximum of self-realisation of its inhabitants.

⁵⁵ Lucien Kroll, ‘Animal town planning and homeopathic architecture’; in: *Architecture and participation*, p.186

Communal housing – social-public

Raines Dairy (1998-2003)

The press praised Raines Dairy for its success in finding a means to fight the shortage in housing in London. However, the architects themselves remain more reserved, still regarding the building as an experiment. Although AHMM used prefabricated units, the whole construction process was no faster than building traditionally. The assembly of the modules itself was a fast process, but there was a long-lasting design phase and unexpected delays on site due to the lack of routine.

The block consists of 51 flats and 10 live-work units, grouped on six floors. The steel-framed modules were manufactured off-site in York and arrived fully-fitted. Work on the modules on site was limited to assembly and fixing the metal cladding. The rigidity of the street façade was aimed to be broken up by an interchange of window and loggia as well as the glazed entrance area, cutting the block in two parts. The rear side appears more diverse with balconies for access and a private outdoor entrance area for each flat. Thus, the inhabitants do participate, at least in creating this lively atmosphere. The plans are architecturally interesting, especially those of the live-work units, reacting innovatively on demographic, social changes: they address a modern, but well-off user.

Concept, coordination, funding:
AHMM architects, Peabody Trust

Manufacturer (modules):
Yorkon

Location (urban setting):
London-Stoke Newington, inner city

Target group:
middle-income family, couple, single

Degree of user participation:
none

Spatial dwelling quality:
flexible, clever plans, spacious

Visual appearance:
massive block, regularity partly enlived

Constructional system:
steel frame units, stacked on metal frame

Ecological/technical performance:
efficient, high-quality building

Time for planning / construction on-site:
14 months / 16 months

Purchase price per dwelling unit:
£205,000 - £250,000



street façade: window – loggia

courtyard façade: entrance area



illustrations:
author and Prefabulous London

Communal housing – social-public

Broadway Estate (2002-2003)

The architects' main ambition was to create communal housing worth dwelling and living in, transmitting an expression of 'ordinariness', a robust everyday beauty. Not at all ordinary are the result and the means of building.

The building is planned as a social housing project for the poor local population. It houses ten one and two bedroom flats. To decrease costs and construction time, prefabricated timber panels form the walls, set into a timber framework. On the courtyard façade the panels are clad with a rain screen of larch-faced timber. The building rests on foundation 'stilts', concrete pile caps which negate the need for the usual ground beams. The scheme is called 'assisted self-build' – young people are given the chance to participate in the construction process of their future home, guided by architect and contractor. The builders' physical contribution is rewarded with reduced rent accommodation. The buildings' straightforward look and the apartment typology also appealed to them. The type of participation here works as a social-political measure, combined with an innovative building system. Although, only the first generation of residents is – temporarily – provided with work and a decent home, the latter remains for the next generation of inhabitants.

Concept, coordination, funding:

Sergison Bates arch., New Isl. & Hackn. Hous. Ass.

Manufacturers:

Rooff Ltd., first generation of residents

Location (urban setting):

Tilbury, Essex, inner city

Target group:

low-income adolescents

Degree of user participation:

limited: participation in construction, political act

Spatial dwelling quality:

efficiently spacious

Visual appearance:

modern framehouse

Constructional system:

timber frame with prefabricated wall panels

Ecological/technical performance:

sustainable building

Time for planning / construction on-site:

about 1 year / 20 weeks

Building price:

£570,000 (gross internal area: 498 sqm)



courtyard façade



prefabricated timber wall



illustrations:
www.rooff.co.uk, Prefabulous London

Communal housing – social-public

Settlement Lessingstraße (1994-1997)

Communal dwelling and living in a high-quality modern environment was the key aim for building up the Settlement Lessingstraße in Weimar. Elements to achieve this goal were mixed-aged inhabitants, housed in multi-family residences within a sensitive organisation of private and public spaces – an antidote against suburbia. To realise the participative building process and the ongoing organisation of the settlement, a co-operative was founded.

The architect consciously refrained from building cheap and standardised houses, even if these were to be affordable for middle-income homebuyers. Costs were saved by high-density, “low-standard” building and the use of repeatable, adaptable components. There was to be an optimal use of the space and the limited range of materials. The basic structure of fair-faced concrete walls, floors and ceilings was cast on site. Prefabricated timber sandwich panels form the exterior wall surface as well as interior walls, floor- and ceiling slabs. The residents choose one of the eight house types, its interior disposition and fit-out. Under the guidance of architect and professional builders, the first generation also participated in the building process. Participation is enacted under special consideration of the re-use value: the house structure remains as flexible as possible to enable later users to adapt the new home.

Concept, coordination:

W. Stamm-Teske architect, Wohnhaus e.G. Weimar

Manufacturers:

local building firms, first residents (Wohnhaus e.G.)

Location (urban setting):

Weimar (Germany), residential area

Target group:

middle-income couple, family, single, old & young

Degree of user participation:

high, essential

Spatial dwelling quality:

dense-spacious, limited-rich, architect's interior

Visual appearance:

communal-individual, natural-planned composition

Constructional system:

concrete core, sandwich panels in timber frame

Ecological/technical performance:

sustainable building, low-energy standard

Time for planning / construction on-site:

3 years / 7 months

Building price per dwelling unit:

36.000-105.000€ (according to house type)

timber sandwich panel

architect's interior

Illustrations and quotes:
W. Stamm-Teske: Wohnhaus e.G. Weimar

2. Customised prefab/Fertighaus – commercial

Representatives of this category, apart from the Huf Haus, are not to be found in England, but flourish on the continent and in Scandinavia. Some German firms look back on a century-long tradition, founded in the nineteenth and early twentieth century. On first glance, the customised 'prefab' or German 'Fertighaus' seems to offer the highest degree of user participation. An endless variety of different house types wait in the wings for the customer of the housing market; families with suburban living ideals are the main addressee. Without question, a large number of homebuilders find an affordable and comfortable dwelling solution within the extensive supply. An alliance between industry, architecture and user of a certain kind obviously exists.

A housing firm offers basically three possibilities to the future inhabitant to compose his home: by choosing one of the wide range of predetermined standard models, by making use of standardised part-solutions (deciding about the rest individually) or by proposing an 'individual' design which is further developed with the firm's architect. Many commercial firms advertise cost savings by self-building parts of the house as well. Three levels of fit-out are usually offered: from basic, to partly-fitted to fully-fitted turnkey homes. Strictly speaking, the amount of own initiative is restricted to the selected scheme, the interior fit-out and 'cosmetic' external variations. Service associations for homebuilders explain the restriction to the interior with guarantee reasons and advise the customer to leave the surrounding walls of his house to a professional, in this case the housing firm⁵⁶.

The individually designed home, provided by a prefabricated housing firm, seems to be a contradiction in terms. Nevertheless, every firm which seeks to have bearings on the high-cost market proudly presents their section of 'individual' solutions, which demonstrates that a prefabricated house does not mean cheap per se. Homes of this type are connected with higher expenses, due to the deviation from the norm and longer construction times which also may cause problems during implementation. The prefabricated 'individual' house tries to blur the distinction to an architect's house – therefore which differences remain?

Certainly one decisive difference lies in the way the houses are marketed. The golden rule of prefabricated housing firms is self-presentation and customer service. In this respect the model house exhibitions⁵⁷ deserve a special mention. The fact that on their grounds most contracts of purchase are sealed is only one proof of the extraordinary success of these exhibitions.

One of the biggest and the most popular permanent exhibitions in Germany has been established in Wuppertal since 1974. The location in an industrial area directly next to the motorway ensures easy access by car. More than fifty single houses are embedded into an artificial suburban idyll with narrow, tree-bordered streets, a lake and a playground for the children. To go shopping for a house, one has to pay three Euros and gets 1:1 models of possible future homes. Every house presents itself entirely furnished according to the latest fashion – and has a customer consultant for immediate design and purchase discussions. Dwelling

"planning concept for individuals"
- category *design*, type *box*
- category *free planning*
(GriffnerHaus brochure)

⁵⁶ 'Wege zum "Eigentum" 3, Das Eigenheim aus der Fabrik', www.sueddeutsche.de

⁵⁷ Musterhausausstellungen

architect-designed 'Fertighaus'
- *O sole mio* by Matteo Thun
(GriffnerHaus brochure)

ideas are as easily collected as desires are awaked. Firms which rely on progressive technological innovation and housing trends replace their houses regularly – every two to three years, those which follow a consistent building tradition only update the interiors.

An example of exceptional customer service on a smaller scale is the showroom of Baufritz in Erkheim (Allgäu). The traditional prefabricated housing firm attempted to set themselves apart from the common 2d catalogues or virtual computer models. 'Die Hausschneiderei'⁵⁸ is teaching the customer a lesson in perception. Its architectural "sensory trail"⁵⁹ conveys the unique characteristics of wood, the firm's main building material, and its effect on the body by touch, sound, smell and look. The showroom is an abstract model building for the customer's inspiration, not for his finished house. The need for extraordinariness – and the investment in an architect to build the showroom – exemplifies the pressures of a highly competitive prefabricated housing market. Despite its architecturally refined character the 'Hausschneiderei' principally is an advertisement.

What is the Achilles' heel of practicing architects is the prefabricated housing market's daily routine. Keywords are efficient building and cost-performance control, for customer and firm alike. The prefabricated housing firm's economic management is equivalent to affordable conditions for a home. What the firms achieve in technological and economical performance, they frankly tell the customer in emotional, popular language – as their publications show. A list of reasons to opt for a prefabricated house gives a clear overview of the branch's guidelines⁶⁰:

1. time: short factory production, fast delivery and assembly
2. security: date of completion and price fixed in advance
3. service: only one service partner, managing the whole building procedure and after-sales care
4. choice: catalogues, virtual 3d models and 1:1 prototypes supporting decision
5. customisation: varying degree of user participation in design
6. quality and comfort: interior fit-out according to user's financial ability and design ideas
7. flexibility: houses allow changes over time of use
8. ecology and economy: high quality construction and technical services, dry installation

The customer is provided with the necessary information for the production of his house (detailed building description, accompanying technical information), but he places the building organisation into the hands of the housing firm. Similar to an architect's contract are arrangements of guarantee, warranty and maintenance; models for financing (credits, etc.) are obligatory. An increase in comfort, but a loss of control and lack of responsibility alike?

The invention of the commercial prefabricated house gave girth to the aversion of the architectural profession. In the eyes of the architect there is a list of deficiencies which opposes the branch's guidelines. The argumentation often starts that a prefabricated house may be adaptable to a particular location, but



Die Hausschneiderei
(www.baufritz-dz.de)

⁵⁸ The house tailoring

⁵⁹ Cornelia Krause, 'Mit allen Sinnen'; in: *db*, 2006 March, p.59

⁶⁰ brochure of model house exhibition in Wuppertal



Artificial suburban idyll
- Musterhausausstellung Wuppertal
(author)

it is still developed without a specific site as basis for the design (point 1: no site-specificity). For the architect the adaptation of unified models and the choice of a formally limited range of standardised elements do neither mean a user-specific, nor an honest participative design. The user's wishes and needs, which the commercial firm presupposes, are those of a market target group (point 2: pseudo design 'individuality').

Although housing firms insist on collaboration, the architect they work with would hardly gain the approbation of the architectural profession. According to a survey among architects⁶¹, firms would usually not look for good, but cheap architects. Practicality and efficiency outweigh essential architectural issues for achieving a spatial dwelling quality. Even if not cheap in structure and fit-out, a Huf Haus is still regarded as a "luxury barrack"⁶² (point 3: lacking architectural quality). Considering urban aspects, the promotion of single-family homes, which is the typology of most prefabricated houses, supports extending suburbia and the waste of land and energy. The house serves the inhabitant as symbol of wealth and comfort, living rather indifferent of what is going on outside his front door (point 4: anti-urban character). The architects' critique has no point of attack concerning ecological and technological performance which is generally high, if not even higher than in conventional building today. Thus, their arguments are directed against the spatial dwelling quality on a micro- and macro scale – within home and built environment.

However, there are architects collaborating with a commercial firm which asked for a temporary joint venture. The result of such a joint venture is *option*, designed by bauart architects and marketed by WeberHaus, or *O sole mio* by Matteo Thun and GriffnerHaus. This kind of alliance brings about the contradiction between the principles of a prefabricated housing firm and an architect's design most distinctly. The architect's model is unique and its distinctive feature cannot be altered, but only replicated as a whole. A customer purchasing *O sole mio* does not display his, but actually Matteo Thun's individual idea of dwelling, which limits the customer's contribution to the design of his home to the act of purchasing a branded object. As far as my idea of a trialectic design is concerned, this is not a partnership between equal participants because the architect prescribes how firm and user deal with his house. Its rigid form impedes an adaptation to inhabitant and site alike. If architects aim to enter prefabricated housing, they will have to find a different way.

61 'Freie Architekten und das Fertighaus?: Eine (kleine) Umfrage'; in: *Architekt*, 1996 Apr., p.253

62 Wolfgang Krenz, 'Freie Architekten und das Fertighaus?: Eine (kleine) Umfrage'; in: *Architekt*, 1996 Apr., p.253



an individual type of WeberHaus
(author)

Customised prefab/Fertighaus – commercial

Huf Haus (since 1912)

The Huf Haus type *Fertighauskonzept 2000* was designed by architect Martin Adams in 1969 and is still successfully marketed by the Huf family. The firm's signature is a traditional half-timbered construction, combined with modern technology, but still a "classic".

The construction is based on a flexible grid which allows a 3, 4, or 5-bay type or an art type (up to 6 bays) with 2.65m ceiling height. Wall panels can be solid or entirely glazed. Opposing the rumour of the 'prefab' as flimsy, modular basements are available. Within this open framework the customer models his tailor-made home, together with the firm's architect. The Huf Haus "compendium", the firm's pattern book, contains everything from wall to chair. In the end, the customer receives turnkey kit packages from the factory. A Huf Haus attracts buyers with its exclusively good quality design, comfort and technology as well as a high resale value – the luxurious 'Fertighaus'. The "open, flowing living space" and the timber construction justify the brochure's motto of a "life in harmony with nature", though it is a life in an artificial suburban nature. An 'urban' type ("multi-apartment design") is available as well, but actually not part of the portfolio. The branding concept works with references to modernism – space concept, functionalism, Bauhaus style – interspersed with the concept of tradition.

Concept, coordination:

Family Huf, Martin Adam architect (initial design)

Manufacturer:

Huf Haus, Hartenfels (Germany), Surrey (UK)

Location (urban setting):

suburban, single-family house

Target group:

middle- and high-income customer

Degree of user participation:

high: disposition and fit-out; none: timber structure

Spatial dwelling quality:

lavishly ample, open plan, light

Visual appearance:

characteristic half-timbered style, modern details

Constructional system:

half-timbered construction, laminated wood

Ecological/technical performance:

traditional construction with modern technology

Time for construction off-site / on-site:

15 weeks / a few days

Purchase price per house:

from 1.935€ (£1,290) per sqm



art type



multi-apartment design



quotes and illustrations:
Huf Haus brochure, www.huf-haus.de

Customised prefab/Fertighaus – commercial

WeberHaus (since 1960)

WeberHaus' *option* was developed as *smallhouse.ch* by bauart architects in 1999. Since 2004 *option* is marketed by WeberHaus, a conventional 'Fertighaus' firm for customers of all income levels. *Option* belongs to their category *individual* – highest design-freedom and price. The model for a modern, mobile generation appears as an exception in the production, leading a rather shadowy existence at the far end of webpage and catalogue.

As all houses of Weber, *option* is a modular kit system with timber frame construction. The exterior walls are executed as sandwich panels with larch timber cladding. *Option* enables a flexible disposition, for WeberHaus, even an extension to terraced housing. "Rational and emotional", says the architect, "ideal mixture of hi-tech and cocooning, the new cosiness", says the firm. With only 63sqm on two floors *option* provides a small, compact, but spacious atmosphere. The open plan is organised into four zones, merging into each other, each defined by a floor-high window. However flexible inside, the rigid box demonstrates a contradiction to prefabrication principles of self-design. The firm's proposal for a model with an inclined roof is reminiscent of the alteration of Stuttgart's Weissenhof Siedlung. A replication of the box does not successfully work either when, from the architectural point of view, it asks to be a solitaire.

Concept, coordination:

WeberHaus, bauart architects

Manufacturer:

WeberHaus, Rheinau-Linx (Germany)

Location (urban setting):

suburban single type, urban variations

Target group:

middle-income young couple, single

Degree of user participation:

high: interior fit-out; none: basic structure

Spatial dwelling quality:

well-organised open plan on limited floor space

Visual appearance:

modernist wooden box

Constructional system:

timber frame construction, requires foundation

Ecological/technical performance:

sustainable building, low-energy standard

Time for construction off-site / on-site:

3 weeks / 1 day

Purchase price per house:

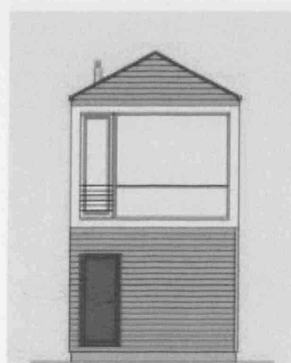
87.000€



option duo (montage)
and with inclined roof



prototype
and market type



quotes and illustrations:
WeberHaus brochure, www.weberhaus.de,
www.smallhouse.ch (bauart architects)

Customised prefab/Fertighaus – commercial

UMA active house (since 2000)

The modular modern box was designed by three architects, Ernst Unterluggauer, Djordje Milosevic and Zaid Al Khafaji, who refrain from publicly mention their names. Although they can and do not want to deny their architectural signature, the final creation of the house is meant to be left to the customer.

An *UMA active house* is – like a dress – available as model S, M, L or XL which means 75, 110, 140 or 170sqm on two floors. UMA's box label is determined but the plan, fit-out and finishes are optional. When requested, a basement is available as well. The construction consists of a steel frame with semi-timber façade. The firm's special, playful feature is an interchangeable, custom-printed "Klickfassade" – sandwich panels in various fashionable designs. However, a cobble-stone front is available in virtual form only. The house is entirely manufactured in the factory and arrives as a finished home on site, including the concrete floor slab (the foundation). There are already four UMA communities with semi-detached *active houses* realised near Vienna, which can serve as model house exhibitions 'life'. Not only the single house, but simultaneously the accompanying environment is offered for sale here.

Concept, coordination:

UMA active house

Manufacturer:

UMA active house, Vienna (Austria)

Location (urban setting):

suburban community, single or semi-detached type

Target group:

middle- and high-income customer, family

Degree of user participation:

high: disposition and fit-out; none: basic structure

Spatial dwelling quality:

flexible, loft-like plan, sober interior

Visual appearance:

modern box, in (virtually) changing skin

Constructional system:

steel frame, sandwich panels & semi-timber façade

Ecological/technical performance:

low-energy or passive house standard

Time for construction off-site / on-site:

3 months / 2 weeks

Purchase price per house:

from 990€/sqm; M: 200.000€, L: 330.000€



"Klickfassade"



quotes and illustrations:
www.uma-activehouse.at

Customised prefab/Fertighaus – commercial

Bo Klok (first apartment buildings in Sweden in 1996, in the UK from 2006)

Bo Klok means “live smart”, equally smart is IKEA’s branding concept. Before developing *Bo Klok*, the furniture company started a campaign to gather the requirements of potential tenants. The target group was defined by combining the company’s aims with a potential customer’s profile.

IKEA consciously insists on vernacular architecture: the kit units are composed of Scandinavian construction and materials. Though the marketing form is experimental – via a furniture company with the label of selling affordable modern design. The customer has a fairly limited choice among one or two bedroom units (48/59sqm, 2.6m high) where only the interior is flexible. Residents, who were lucky to be chosen, are provided with a free consultation with an interior designer and a furniture voucher. Obviously, IKEA follows a clearly defined economic and social target. The company’s own housing cooperative manages sale and re-sale; there is no open market for *Bo Klok*. The Ikano Bank (part-owned by IKEA) provides financial services. *Bo Klocks* are sold in fixed communities only: L-shaped blocks of six flats on two floors with a maximum of 36 apartments on site. As the house itself, the communities wear a conventional, quite uniform outfit, but consider local site requirements. Five developments have mushroomed in Sweden already and there are export plans for the customised Scandinavian vernacular.

Concept, coordination:

IKEA, Ahlsröm Arkitektbyrå architect

Manufacturer:

IKEA: interior, Skanska: housing unit (Sweden)

Location (urban setting):

suburban community

Target group:

young family, first-time buyers, class not specified

Degree of user participation:

limited on choice of flat and interior fit-out

Spatial dwelling quality:

conventionally modern, including garden

Visual appearance:

vernacular Scandinavian style

Constructional system:

timber frame construction

Ecological/technical performance:

conventional

Time for construction off-site / on-site:

? / 3 weeks per block

Purchase price per dwelling unit:

two bedroom flat: £7,500 or £200 monthly rent



Scandinavian dwelling
including garden



IKEA-fied* interior
*Christopher Middleton, “Welcome to flat-pack town”,
www.telegraph.co.uk



quotes and illustrations:
www.ikea.com, A. Arief: Prefab

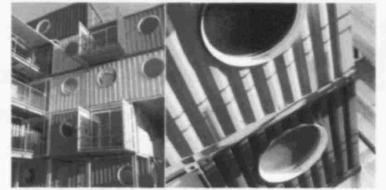
3. Mobile units – nomadic

Parallel to the development of OSM in the public and speculative housing sector, there is a growing interest in prefabricated mobile units for private and smaller projects alike. Architectural firms have recently undertaken various research projects, but as Raines Dairy has shown, the use of fully-fitted dwelling units from the factory is still in an experimental phase. Their application for private homes is even less developed than for public housing where financial support is often provided.

A few years ago, recycling transport containers evolved as a popular way of modular building, most suitable for short-term dwelling. Various projects, like the *Container City* or *MoMo – Mobile Modular*⁶³, were occupied with turning the restriction of the rigid given form into a challenge to create a contemporary building. It is questionable though, whether the 'container type' is capable of forming a lasting typology, or whether it will rather remain the experiment, as for Kenneth Powell "it is not the future of architecture"⁶⁴. The units show many advantages like cheap accessibility, ecologic re-use of available material, they can be transported and stacked to any configuration at any suitable place. Nevertheless, the re-figuration of the box itself is restricted: a container remains a container.

The story of the container is exemplary for the situation of housing types assigned to this category. There is a wide range of prototypes and one-off solutions which often arise as a by-product of architects' practices – therefore gain the label 'architectural'. The application of forms of standardisation is still little developed; in some cases, there is even no industrial manufacturer involved. Design, production and sale/marketing do not necessarily intersect yet, though this would be essential for an efficient home production. The often published image of *SU-SI* on the truck unmistakably indicates the kinship to the American mobile home. When classified as such, the unit is exempted from most building regulations; it does not need foundations, but a chassis to be transported as a whole from the factory to its destination. Like Archigram's architectural 'plug-in' ideas, the mobile 'pod' will be connected to existing services (electricity, water, sewage) on site. What is everyday business in the USA seems to be still in its infancy in Europe.

The target group for the different types in this category varies, but in most cases the appeal to a young generation is its flexibility in dwelling and living needs. With a mobile dwelling unit the social change from the need for permanent to temporary housing is considered. Also varying is the degree of user participation – the architectural expression stands in the foreground, what the design outfit distinctly demonstrates. The modular solutions shown here have in common that they come along as fairly ready-made objects, with little scope for the customer's participation. Of interest is the wide variety of results, showing possible uses of prefabrication but in terms of constructional, technological and economic innovation, more than in participatory respect.



Container City II, Nicholas Lacey Partners
(www.containercity.co.uk)

⁶³ Nicholas Lacey Partners,
AHMM architects, both
London

⁶⁴ Kenneth Powell; in: *Architects' Journal*, 2006 May
25, p.37

SU-SI on the truck
(Kaufmann brochure, www.kaufmannzimmerei.at)

Mobile units – nomadic

SU-SI, FRED (1998, 1999)

SU-SI and *FRED* stand out by their straightforward, but high-quality craftsmanship of timber construction. The two types of mobile homes evolved from a collaboration of architect and carpenter.

The basic 30sqm *SU-SI* is a one-person home. Apart from living in it, the box is a suitable work unit alike. *SU-SI* can be extended by further modules up to 50sqm, but the size of add-on space offered is not flexible. Depending on the location, *SU-SI* can be erected on space-saving stilts. The factory-made turnkey unit is mounted in five hours. Carpenter Kaufmann promises that *SU-SI* provides “attitude” to living; this is true, but without much interference of the user.

FRED’s finesse lies in the expandable-contractible system which minimally measures 3x3x3m. The customer determines layout and set-up and selects one of ten types of wall façades. The ready-designed and fabricated unit is assembled in two hours. *FRED* offers “reduced dwelling” on 16sqm floorspace.

SU-SI and *FRED* stand in-between tradition and innovation. The handcrafted timber structure, which is partly industrially fabricated, is conventional, but the typology of mobile home in the high-quality, contemporary form in which this is executed, is innovative.

Concept, coordination:

Johannes Kaufmann architect, Reuthe (Austria)

Manufacturer:

Oskar Leo Kaufmann carpenter

Location (urban setting):

mobile unit for urban or suburban location

Target group:

younger generation, mainly single

Degree of user participation:

limited on layout, set-up and façade variants

Spatial dwelling quality:

minimalist open space, light, crafted interior

Visual appearance:

refined box, craftsman work

Constructional system:

timber construction

Ecological/technical performance:

sustainable building; needs services

Time for construction off-site / on-site:

5/6 weeks / a few hours

Purchase price per dwelling unit:

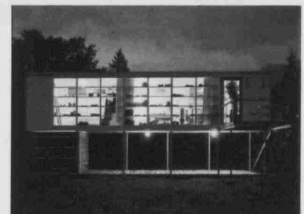
SU-SI (40sqm): from 81.000€; *FRED*: 45.000€



FRED



SU-SI



quotes and illustrations:
www.jkarch.at, www.kaufmannzimmer.at

Mobile units – nomadic

m-house (2002)

On his homepage Tim Pyne reminds the architecturally interested customer of Cedric Price who influenced the design. Visiting the model house in the countryside near Canterbury, the customer can convince himself whether *m-house* has become an “iconic object” already.

With two 17x3x2.40m volumes – together 240sqm – the double-wide type is spaciouly measured. By removing the interior walls, the home can be transformed to a work space. *M-house* uses high-quality components and fulfils demands of ecologic technology. In collaboration with Corus a prefabricated aluminium roof system was utilised. To adapt to the characteristic traits of each customer and site, there is a range of façade claddings to choose from. *M-house* arrives as fully-fitted turnkey version: flat-packed in two 3m-pieces or within two shipping containers, it can be delivered to anywhere. Although the house meets the criteria for a mobile home, it is marketed as permanent dwelling – “a building for life”. Customisation of the interior is also possible, but “within reason”. According to the architect there is not much free play for alterations and for improvement of a house which is already tailored to the essential dwelling conditions. He also remains silent as to why *m-house* is pronounced ‘mouse’; it was the architect’s mouse clicks which designed the home, not the customer’s.

Concept, coordination:

Tim Pyne, Mae architects

Structural engineer / Manufacturer:

Atelier One / Corus (roof system)

Location (urban setting):

suburban prototype, virtual urban types (webpage)

Target group:

younger generation, couple, family

Degree of user participation:

minor interior alterations, façade variants

Spatial dwelling quality:

loft character, contemporary home

Visual appearance:

mobile-stationary box

Constructional system:

self-supporting mixed structure, aluminium roof

Ecological/technical performance:

energy-efficient; needs services

Time for construction off-site / on-site:

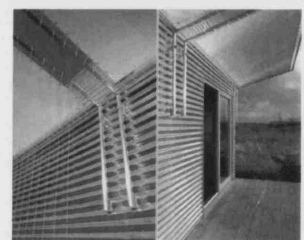
12 weeks / 1 day

Purchase price per dwelling unit:

double-wide type for £98,500



prototype near Canterbury



quotes and illustrations:
Tim Pyne, www.m-house.org

4. In-fill, top-on, add-on – adherent

The types of this forth category can rightly declare that they oppose the reproach of prefabricated houses to be characteristically suburban, ergo anti-urban: these are truly urban homes. As top-on or add-on space the prefabricated units work with the existing built material of the city.

In recent times, architects and engineers discovered the city's rooftop spaces and initiated the new penthouse development. The main intention of using prefabrication here is the extension of buildings with contemporary means, regarding construction technology and/or architectural expression. Instilling a new element into a given urban structure demands for a sensitive treatment of base and top-on or add-on dwelling unit, to form a sane bond of old and new. The projects choose different ways of formulating this connection: they either appear as independent units, standing out from their basis, or as reticent models, adapting to the building they sit on – as London's *Bankside Lofts* by First Penthouse show.

The models' architectural qualities as well as the relation to the user are similar to the preceding category: according to the principle of mass customisation, the user is consciously enabled to participate in certain parts of the home, which are mostly interior fit-out and façade structure (type and arrangement of openings, selection of cladding etc.). Although the built outcome distinctly differs from a standard prefabricated house, wearing an 'architectural', contemporary outfit, it is only little customised; the input of the user reminds of the design process of a conventional 'Fertighaus'. The *open space* concept of the young commercial firm GriffnerHaus offers the user even more flexibility to compose a modern home, including architectural attributes like flat roof and open plan.⁶⁵

Mass customisation in architecture would allow for more user participation, but its possibilities as well as restrictions are not sufficiently explored yet. Again, one has to speak of a transitional phase, since the development has just begun and it is still open, where it will finally lead architecture to. Including the English bay window and a bedsit into contemporary design, as Piercy Conner architects have done, shows that this transition into new ground equally considers dwelling traditions as well as elements of modern life and architecture – it starts a change from within.



Flying dwellings
(Studio Aisslinger, www.loftcube.net)

⁶⁵ see ill. p.30

In-fill, top-on, add-on – adherent

Loft Cube (2001-2003)

Werner Aisslinger designed his rooftop dwelling for the generation of modern “nomads” who continuously change location for living, working and dwelling.

The *loft cube* presents itself as a self-conscious parasite in the inner urban structure. Sitting on existing rooftops, it maintains its very own appearance. With floor-to-ceiling windows at all four sides, the *loft cube* is offered a 360° view of the city at its feet. The galvanised steel frame construction is clothed in a powder coated outer skin. Basis of the construction is a 1.25m modular grid which allows a customised interior design. Internal organisation and fittings are adaptable, as well as the opening position and type. In advance, the customer can choose between a 39sqm and a 55sqm unit; moreover, various unit compositions are possible. When the *loft cube* is not assembled by hand, it arrives at its location as a whole, in the same way as it can be re-located again: by crane or helicopter. The architect aimed to set up a marketing strategy for mass manufacturing, oriented at the car industry. His ‘flying dwelling’ is subject to the regulations of a mobile home and usually does not need building permission. A *loft cube* inhabitant dresses in the identity of a futurist-designed architect’s home.

Concept, coordination:

Werner Aisslinger, Bracht, and 8 architects

Manufacturer:

Loftcube GmbH, CEO C. Friedrich, Munich

Location (urban setting):

urban location, rooftops

Target group:

modern nomad, single or couple

Degree of user participation:

limited on interior layout, opening position & type

Spatial dwelling quality:

loft-like open plan, flexible internal disposition

Visual appearance:

space-ship design, futurist

Constructional system:

light-weight steel frame construction

Ecological/technical performance:

energy-efficient; needs services

Time for construction off-site / on-site:

3 months / 2-4 days

Purchase price per dwelling unit:

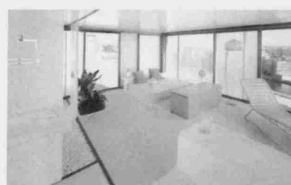
39sqm: 126.400€, 55sqm: 167.000€



the city at the loft cube's feet



interior partition elements



quotes and illustrations:
loft cube booklet, www.loftcube.net

In-fill, top-on, add-on – adherent

Brooks Road (2004)

Two years ago, the RIBA commissioned a competition for urban regeneration at Brooks Road housing estate. Piercy Conner architects won the first prize, but because of technical doubts Newham Council abandoned the plans for executing their project and chose the second prize winner instead.

Piercy Conner designed thirty prefabricated loft apartments, functioning as “flexible overcoat” to enrich and extend existing houses with new dwelling space. The add-on area is to be used for service, living or circulation spaces; an individual fit-out is possible. The folded extension consists of a steel frame made up of a kit of parts with prefabricated ‘nodes’ to connect the frame. It is structurally independent, but nevertheless, adaptable to each base. With the kit design it becomes possible to meet varying demands of customer and site. The architects saw the modules as mediation between new residential streets and the existing built structure, an in-between of public and private space. The add-on units are orientated to the street life like “a modern bay window.” What makes the project interesting is the interpretation of traditional housing schemes to regenerate an existing structure by its own, but contemporary means. Oscillating between tradition and innovation, an additional bedsit to rent out was incorporated in the futurist add-on space.

Concept:

Piercy Conner architects

Manufacturer:

Corus

Location (urban setting):

London-Newham, residential area

Target group:

middle-income city dweller

Degree of user participation:

limited on interior fit-out

Spatial dwelling quality:

open-secluded spaces, urban living

Visual appearance:

futurist, playful

Constructional system:

steel frame structure

Ecological/technical performance:

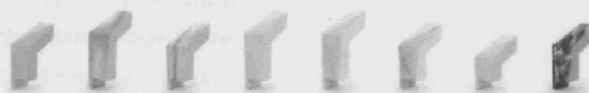
add-on as environmental buffer

Time for construction off-site / on-site:

tbc

Purchase price per living unit:

tbc



“flexible overcoats” for Brooks Road



quotes and illustrations:
online portfolio, www.piercyconner.co.uk

5. Digital, virtual projects – conceptual

The ready-made 'prefab' off the peg and the digital dwelling machine embody two opposing poles in prefabricated building. Almost every notable modern firm develops research studies on dwelling visions, so that it seems to be a 'finger-exercise' essential for architectural practice. But does it have serious implications on reality?

In contrast to realised or realistically planned models the two conceptual projects show a virtual future scenario. Their basis is the intersection of digital design information and tools for building production. Digital models, numerical plans and machine technology take the place of traditional means like architectural drawing and physical model. All design information remains within the computer and is directly transferred to the machine which will fabricate the components of the developed house. With the help of CAD/CAM⁶⁶ software a 3d virtual model is mathematically reduced to 2d information, a numerical code, which is legible for a CNC⁶⁷ milling machine. This produces a mould for the house components or the components directly. If a physical model is built, it can be scanned⁶⁸ and edited with 3d visualisation software, and is equally prepared for manufacture then.

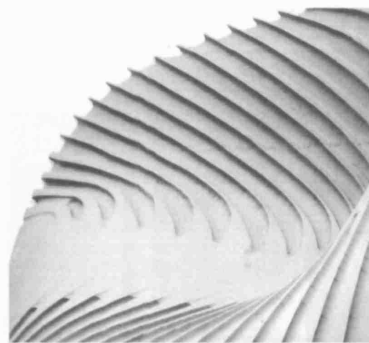
Digital production is typical of machine- and vehicle building and was adopted by modern home manufacturers, but manufacturing technology and process are only two elements of car production. The third element is an effective marketing strategy – the branding – which ensures the success of a product. The two case studies portray an application of mass-customised production, involving architect, user and digital, industrial fabrication. The user can influence the later product at any point of the design process; adaptations of already created models are equally possible. Instead of providing the customer with a catalogue of fully or partly finished houses, he is given a number of variables and parameters to work with. On the one hand these assist him during the design process, and on the other hand make an automated fabrication process possible. Once developed forms are repeatable, but strictly speaking not standardised.

The only US project included here raises the question again, what could the European prefabricated housing market learn from the historically more advanced American one? The fascination with futurist architectural visions resembles an irresistibly recurrent wave; references to the Situationists or to Archigram are hard to overlook. What is striking is that virtual projects of the kind displayed in this category and the accompanying excited publications are about five years old. The reason may be that there are still problems, concerning technical feasibility and harmonising the architectural design with the fabrication procedure. Moreover, it is questionable, whether a new kind of technoid architecture appeals to a wider public when industrial building ignores the user's emotional wish for 'homely' qualities. If the development shared the same destiny with the 1960's technical architecture, it would pass by as a historical period of experimentation but without remarkable influence on people's home – having missed a good opportunity to do so.

⁶⁶ CAM: computer aided manufacturing

⁶⁷ CNC: computer numerical controlled

⁶⁸ 'form digitalisation'; the technical term is 'reverse engineering'



Greg Lynn, *Embryologic House*, 2000
(in: *arch+*, 2001 Dez., p.72)

Digital, virtual projects – conceptual

Manufactured Housing (2001-2002)

The unmistakable model for *Manufactured Housing* is the American caravan, transfigured to a high-tech shape. The architects' motto was "to provide a traditional low-culture sector with a high-tech infusion", opposing prejudices against prefabrication and involving the customer. He is provided with a life style and a new "dwelling-performance" – his home is a brand.

The design is a foldable system, consisting of one main body of which various subordinated parts can be pushed out. When the caravan unfolds, former interior surfaces and spaces become exterior ones and vice versa. The living spaces are characterised by fluid and changing zoning. Different multi-functional panels are manufactured with the help of digital production methods. The panels unite constructional system and façade, which are separate parts for the common prefabricated house. The surface of this construction-façade complex is sculpturally executed. By defining the openings in terms of number, location and size, the user is involved. Finally, the interlocking panels are bolted together; the joints in-between are load-bearing and force-fit. Architect, technology and industry would have to cooperate for this project. The user's input is limited on interior and façade alterations, but he is consciously allocated a particular position within the process.

Concept, coordination:

Andrew C. Thurlow, Maia Small architects, USA

Manufacturer:

tbc

Location (urban setting):

wherever there is (temporary) space

Target group:

young, mobile generation

Degree of user participation:

digital customisation of openings and façade

Spatial dwelling quality:

futurist, space-economic open plan, temporary

Visual appearance:

high-tech caravan, dwelling vehicle

Constructional system:

aluminium frames, bolted

Ecological/technical performance:

innovative, rather than ecologic technology

Time for construction off-site / on-site:

tbc

Purchase price per dwelling unit:

tbc

customised façade – openings

quotes and illustrations:
arch+, 12/2001, archithese, 2/2003

Digital, virtual projects – conceptual

Variomatic (1999/2002)

Variomatic resulted from a Dutch study project in 1999. Here, the motto might have been: “Pluck your house into the desired form!” Design and sale of this home happen exclusively via the internet. The architect invented a ‘configurator’ called *Variomatic* which enables the customer to compose an individual house within a given urban structure, predetermined by the architect. Oosterhuis pre-programmed his design project for user interaction, so that his signature remains.

Since the urban masterplan is predetermined, certain parameters for the houses are fixed as well. The architect reduces the spontaneity of the user’s impact, but equally the complexity of the task for a non-professional – the key element of mass customisation. Three basic types, *mini*, *midi* and *maxi*, are offered. With the help of customised CAD software, the user defines size, façade design and interior disposition online. The result is presented as a 3d model. Since design and production are interconnected, the created home can be ordered as set of drawings or even pursued further to application for building permission. Prices are calculated in real-time. The project still has the status of an online computer game, but presents an idea with potential – though questionable architectural form.

Concept, coordination:

Kas Oosterhuis architect, Rotterdam (Netherlands)

Manufacturer:

tbc

Location (urban setting):

residential areas (suburban)

Target group:

middle-income customer

Degree of user participation:

high: design within a given framework

Spatial dwelling quality:

squeezed open plan

Visual appearance:

playful, but questionably arbitrary

Constructional system:

steel profiles/panels, variable fillings (brick, straw)

Ecological/technical performance:

environmental and ecological aspects considered

Time for construction off-site / on-site:

tbc

Purchase price per living unit:

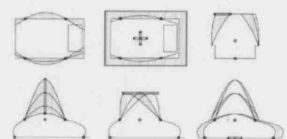
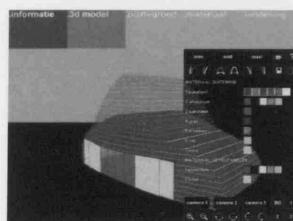
250sqm for 431.000€ (incl. land)



given urban masterplan



online configurator



illustrations:
www.oosterhuis.nl, *archithese*, 2/2003

Conclusion

Open tool-kit

Both form and contents of my report aim to express that there cannot be one, but a number of answers to the question of how to achieve more presence and influence for the user in modern architecture. Building with prefabrication is one possible way, still being “a particular response to a specific set of conditions”⁶⁹. Prefabrication offers the opportunity to improve the architect’s relation to a greater number of users as well as to increase the quality of a greater number of lower-cost homes, when savings in production can be spent elsewhere. It is not to be used as a means to level architectural production as a whole by reducing it to this one and only way of building. A sensible variety appears as logical consequence, considering the multitude of living concepts today. Frei Otto assures that “architecture admits an endless spectrum of variations. Every-one of the five million people of this earth could have a different house.”⁷⁰

The “building system”, which I described as a future scenario before, derived from the idea of building as ‘open system’, consisting of elementation, components and a “generally valid modular order”⁷¹. The potential customer/client is approached with a design in tool-kit format, not with a finished building. Fixed prices, with which the conventional ‘Fertighaus’ advertises, are provided as well, not for the whole though, but for ‘packages’ or components. The design and building process remains more flexible, but is still predictable and moreover, increased initiative from the user is demanded.

The design flexibility of the conventional prefabricated house often resembles surface decoration, but it is still cheaper than innovative, more individual models. The high economic pressure becomes visible: prefabrication projects have to be cheaper than traditional building to get a grip on modern architecture housing, as yet this is not always the case. There are contradictory opinions about the efficiency of prefabrication, but an architect’s house is not necessarily more expensive than a ‘Fertighaus’ of the category ‘individual’ – it might take longer to execute though. Nevertheless, a ‘Fertighaus’, even as ‘individual’ type, is relatively inflexible to sudden changes in the design, especially during implementation. If done so, problems arise and costs rise. In case higher expenses are tolerable anyway, why not go to an architect then who traditionally offers an individual design?

It seems more necessary to improve the quality of less expensive prefabricated houses, which is the main goal of mass customisation in architecture. However, the concept of mass customisation contains the flaw of offering a multitude of possibilities on the surface and serving a neoliberal market structure in the core. To add to that, the characteristic of architecture is its complexity – a home is not a dress. The appropriation process for a home is distinguished from the appropriation process for clothes, since we normally do not want to change our home – and identity – like a fleeting fashion. The concrete wishes of an individual client differ from the potential needs of an anonymous economic target group. Mass customisation opens up a new freedom in building for my three parties, but it also demands to consider critically how to apply it.

⁶⁹ Nicolas Pople, *Experimental houses*, p.20

⁷⁰ Frei Otto, ‘Serienprodukt als Unikat?’, in: *Architekt* 1996 Apr., p.252

⁷¹ Hanns Uelner, in: ‘Freie Architekten und das Fertighaus?: Eine (kleine) Umfrage’, in: *Architekt* 1996 Apr., p.253

Andreas Gursky, *Untitled V*, 1997 (excerpt)
(in: *arch+*, 2001 Dez., p.35)

Re-organising and 'modernising' the architectural profession seems appropriate, but that does not mean to take over a popular market sector. Plans of an alliance of architect, user and industry are fruitful, as already existing examples of 'building team solutions'⁷² show, but an alliance is not a fusion, as Colin Davies' argumentation suggests. Architects should not attempt to become industrial managers, civil engineers or programmers⁷³, but should bring in their skills for collaborative work. Does the user need to change alike? It often seems so, when it is continuously repeated that "the user is not ready yet" – he was not ready for modernism in general, and for the modernist prefabricated house in particular. He never wanted to let go of his traditionalist dwelling attitude. But can he be blamed, or should the architect be as well? The user's crea(c)tive, though unpredictable role of inhabiting the architect's design⁷⁴ needs further attention and especially further ideas how to realise current theories in practice.

Therefore, the dissemination of architecture, especially of developments and achievements in the field, is most important. In cooperation with the media it is the obligation of the architectural profession to inform a wider audience. A very popular example is Kevin McCloud – "the public face of architecture in Britain"⁷⁵ – and his *Grand Designs* programme on BBC Channel 4. Generally understandable information on architecture is associated with his figure – language and didactic of planning could be similarly legible. A specific example from the USA, www.fabprefab.com, shows how the public is informed exclusively about achievements in the prefabricated housing sector online.

However, my main thesis was to take the architectural object itself – the house – as instrument for disseminating the quality of modern architecture. Using a keyword of prefabrication, I regard the built environment as a 'catalogue'. The case studies have demonstrated that there are as many possibilities of as experiments with prefabrication at the moment, but there is no type equally satisfying architect, user and industry. In fact, the majority of housing projects today include factory-made elements already, but that makes them neither a building system nor a quality prefabricated house. For a successful application the holistic concept is mandatory. Nevertheless, it is my understanding that it is worth following the process of exploring what prefabrication can offer to architect and user for creating a modern home.

Our urban and suburban space portrays the ambiguous position of architecture in-between art and technology, the architectural profession and the public. Architecture shows an "aristocratic pleasure to displease", enriching the environment with "the spice of the surprising"⁷⁶ and at the same time it provides the people with a home: a most traditional need. The *IBA Musterbausiedlungen* or the semi-participative project *Neues Bauen am Horn* of the Bauhaus-Universität in Weimar can be compared with a commercial model house exhibition. In contrast to the latter, I give these two the biased name 'architectural' model house exhibitions. Representatives of high quality in modern architecture are part of our everyday life, but the majority of people do not conceive them as 'model houses' for their own home. To see those, they visit the model house exhibition in Wuppertal. The task then for the architectural profession would be to ease the transfer from quality modern architecture to the user's own four walls.

⁷² "Bauteamlösungen"

⁷³ Florian Böhm, 'Zum Stand der Kunst des industriellen Bauens'; in: *arch+*, 2001 Dec., p.83

⁷⁴ Jonathan Hill, 'An other architect'; in: *Occupying architecture: between the architect and the user*, pp.140-143

⁷⁵ Will Hurst; in: *bd online*, August 4, 2006

⁷⁶ Charles Baudelaire, in: *Fleurs du Mal* (1897)



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